

Two new land snails of the genus *Humboldtiana* (Gastropoda: Pulmonata: Humboldtianidae) from Chihuahua, Mexico

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ABSTRACT

Humboldtiana corruga new species and *Humboldtiana sylvania* new species are described from Chihuahua. They are characterized by anatomical features as well as shell morphology.

INTRODUCTION

Snails of the genus *Humboldtiana* comprise some of the larger land snails in Mexico. In most cases the species occur in sparsely populated colonies, and they have insular distribution patterns. Uniform distributions over areas larger 1 km² are rare in what appear to be appropriate habitats. Instead, species occur in isolated colonies, with local endemism being the rule. This study describes two such species. Their descriptions are prompted by the need to round out phylogenetic studies (Mejía, in prep.) We use the following abbreviations for shell measurements: H: height; W: width; AH: aperture height; AW: aperture width. Repository institutions are: ITCV, Instituto Tecnológico de Ciudad Victoria, Tamaulipas, Mexico; UF, Florida Museum of Natural History, University of Florida, Gainesville, Florida.

SYSTEMATICS

Family Humboldtianidae Pilsbry, 1939
Genus *Humboldtiana* von Ihering, 1892

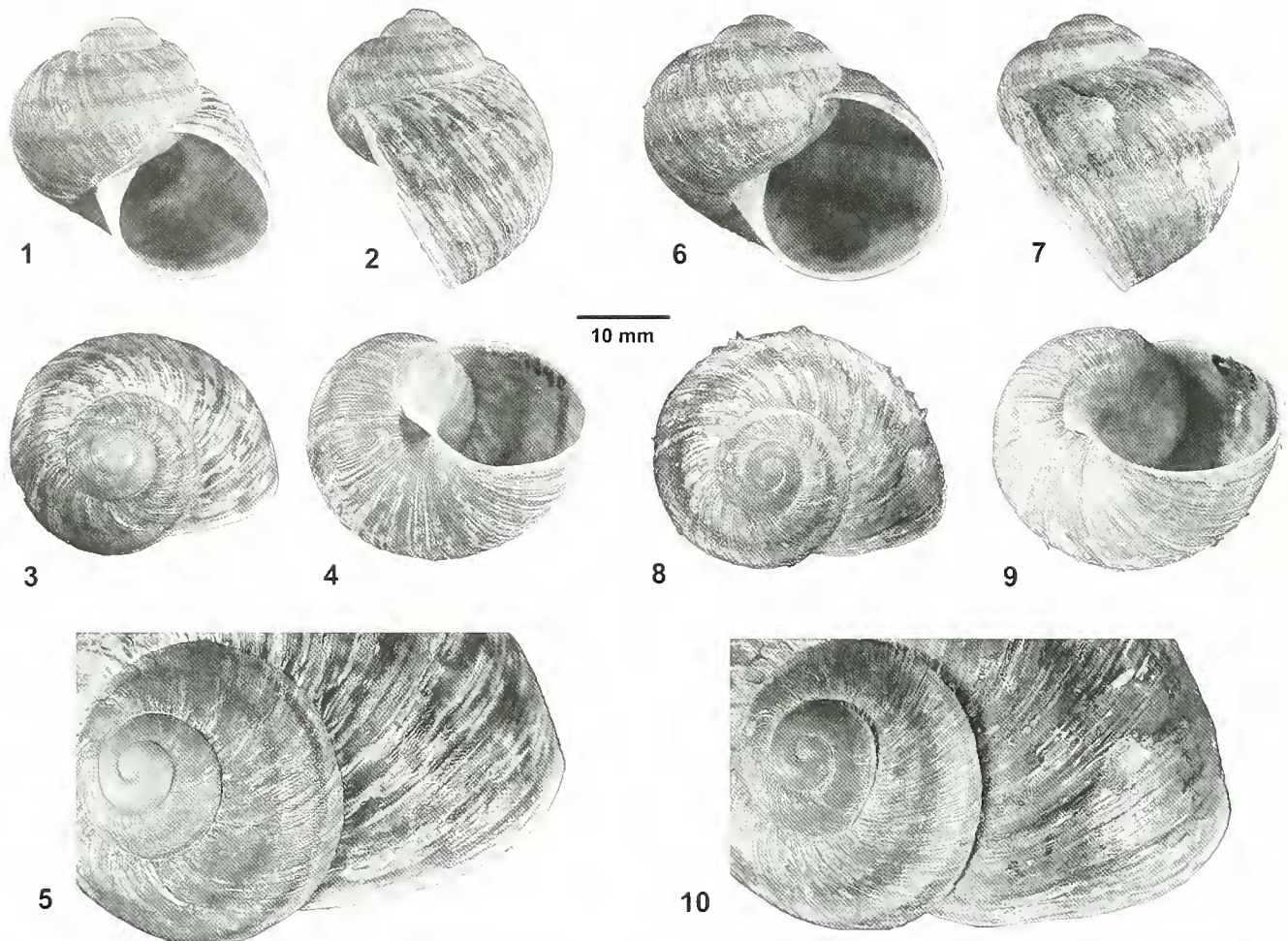
Humboldtiana corruga new species

Diagnosis: This is a moderately large species that has smooth embryonic whorls. The globose shell is about as high as wide. It is sculptured with rugose growth wrinkles on the postembryonic shell, with dense granular sculpture aligned with the growth wrinkles. The color pattern consists of three narrow blackish bands of equal size on a dark brown ground color. The whorls are inflated and tend to take on a square appearance. The last whorl has a distinct shoulder and has a slightly channeled suture. The edge of the peristome is blunt and not reflected.

Description: The shell (Figures 1–5, Table 1) is medium in size, about 32 mm wide, globose in shape, about 1.02 times as high as wide. The color is lusterless dark brown with lighter brown streaks along the growth lines, and with three nearly equally narrow black bands. The bands are well defined, although they tend to be disrupted by transverse streaks on the lower half of the body whorl. The aperture is lighter brown and banded internally. The shell has up to 4.0 whorls. The 1.5 embryonic whorls protrude conspicuously above the following whorls. The first embryonic whorl is 5.8 mm wide transverse to the initial suture. The postembryonic whorls are inflated with a noticeable shoulder and a channeled suture which tends to give the whorls a squared appearance. The last half-whorl gradually descends to the aperture. The peristome inserts on the lower edge of the lower band. The embryonic whorls are smooth (Figures 3, 5). The postembryonic whorls are sculptured with coarse growth wrinkles and striations, which are continuous to the peristome and into the umbilicus. Numerous minute granules are superimposed on the growth wrinkles. The granular sculpture extends from the suture to the base, but it does not continue into the umbilicus. The aperture is wrinkled internally beneath the outer sculpture. The aperture is 1.3 times as high as wide and is about 0.73 times the height of the shell. It is prosocline at an angle of 18° to the shell axis (Figure 2). The peristome is blunt-edged, and is not reflected along the upper, outer, and basal lip, but it is broadly reflected along the columellar lip to partially cover the umbilical area (Figure 4).

Anatomy (Figures 11, 12): The anatomy of the holotype is described. The head-foot is gray above and on the sides bordering the sole. A lighter gray zone extends on the sides from the snout posterior to the mantle collar. The sole is very light gray. The mantle collar is light gray. The outer wall of the mantle cavity is light gray and is reticulated with narrow black lines.

The genital atrium (**gen at**) is slender, and is about a third the length of the penis (Figure 11). The penis is 14 mm long and is bulbous with a slight constriction near



Figures 1–10. New species of *Humboldtiana*. Shells. **1–5.** *Humboldtiana corruga* new species. Holotype, UF 358872. **6–10.** *Humboldtiana sylvania* new species. Holotype, UF 353714.

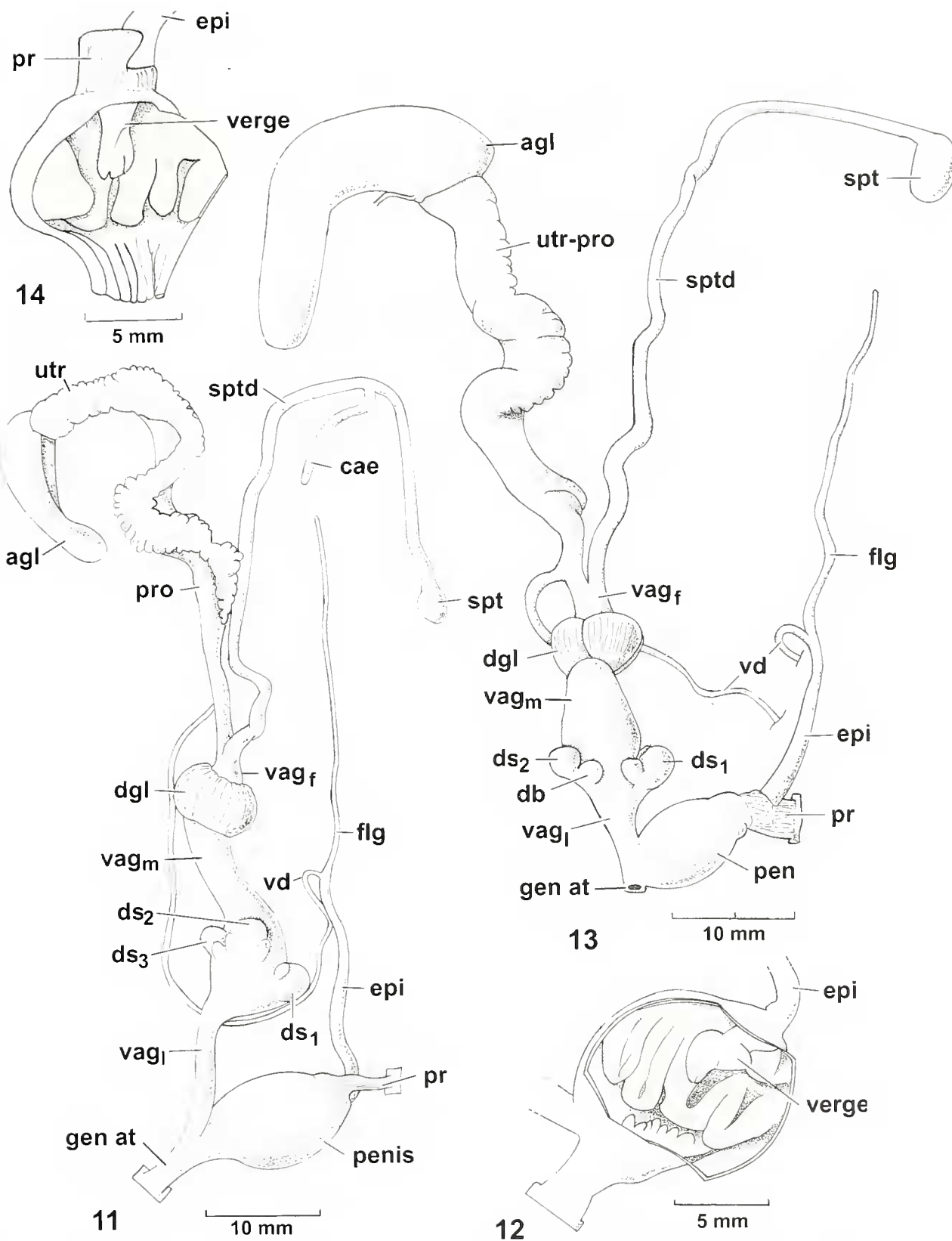
the apex at the insertion of the penis retractor muscle (**pr**). The penis has a verge that extends about half the length of the cavity. The verge is surrounded by a heavy pendulant curtain of glandular tissue (Figure 12). The lower wall of the penis bears a few small longitudinal folds below the curtain. The penis retractor muscle (**pr**) is 6 mm long, and is relatively short and moderately stout. It originated on the inner wall of the lung slightly behind the middle of the mantle collar, and inserts on the apex of the penis where it forms a narrow sheath around the base of the epiphallus. The epiphallus (**epi**) is slender, and is slightly longer than the penis. It is lined internally with four longitudinal folds. The slender flagellum (**flg**) is about as long as the combined length of the penis + epiphallus. The vagina is about 16 mm long. The lower vagina (**vagi**) has a long slender neck, and bears four dart sacs of equal size (**ds₁**, **ds₂**, etc) each with a pair of dart bulbs (**db**) distinctly protruding at its base. The bulbs are embedded in the wall of the vagina and form conspicuous bulges in the wall. The dart glands (**dgl**) are widely separated from the dart sacs. The middle vagina (**vag_m**) is about as long as the lower va-

gina, and is considerably stouter. The free vagina (**vag_f**) is very short, and is barely visible above the dart glands. The spermatheca (**spt**) is small and globular. The spermathecal duct (**sptd**) is very long; the combined length of the spermatheca + duct is 65 mm. The duct bears a caecum (**cae**) at about a third of the distance below the spermatheca. The length of the uterus-prostate is about 40 mm.

Type Material: Holotype, UF 358872, collected by Omar Mejía, 25 August 2003; Paratype, ITCV (1 shell);

Table 1. *Humboldtiana corruga* new species. Measurements of the holotype and the paratype. Measurements of the paratype are incomplete because it has a fractured lip and apex. Abbreviations used are: H: height; W: width; AH: aperture height; AW: aperture width.

	H	W	AW	AH	Whorls
Holotype	31.5	31.0	17.6	23.0	3.8
Paratype	—	32.5	18.5	—	4.0



Figures 11–14. New species of *Humboldtiana*. Reproductive anatomy. 11–12. *Humboldtiana corruga* new species. 11. Reproductive system. 12. Interior of penis. Abbreviations: agl: albumen gland; cae: caecum; db: dart bulb; dgl: dart gland; ds: dart sac; epi: epiphallus; flg: flagellum; gen at: genital atrium; pr: penis retractor; pro: prostate; spt: spermatheca; sptd: spermathecal duct; utr: uterus; vag: vagina; vd: vas deferens. 13–14. *Humboldtiana sylvania* new species. 13. Reproductive system. 14. Interior of penis.

both from the type locality. Measurements are given in Table 1.

Type Locality: Chihuahua, 0.8 km south and 0.3 km west of Norogachi, Chihuahua (27°15.9' N, 107° 7.8' W), 2280 m altitude, open *Pinus-Quercus* woodland.

Distribution: Known definitely only from the type locality.

Etymology: The species name *corruga* derives from the Latin, *co*, meaning together or with, and *ruga*, meaning a wrinkle or fold. The name alludes to the coarse wrinkled sculpture on the shell.

Remarks: *Humboldtiana corruga* differs from other known species by its distinct anatomical features. *Humboldtiana corruga* is unique within the genus because of the following combination of anatomical characters. It has a long genital atrium. The penis has a moderately long verge, which is surrounded by a curtain of glandular tissue. The lower vagina has a long slender neck. The middle vagina is long and widely separates the dart sacs from the dart glands. The vagina bears four dart sacs of equal size, each of which is bordered by two dart bulbs. The spermathecal duct has a relatively long caecum that is located at about two-thirds of the distance from the base.

Humboldtiana corruga superficially is similar to another undescribed species from near San Ignacio Arareco, southeast of Creel, Chihuahua in that the shells are similar in size, and have similar color patterns (Thompson, in press). In *H. corruga* the umbilical perforation is more conspicuous, the aperture is proportionally higher, the suture is more deeply impressed and is channeled along the body whorl, the bands are narrower but better defined, and the bands are equal in width.

A very closely related form, which we tentatively identify as *Humboldtiana corruga*, comes from Bagueachi, Chihuahua (27°26.3' N, 107°30.3' W), 1940 m altitude (UF 359518). Bagueachi is about 8 km west of Norogachi. Our only available specimen has an immature shell. Its reproductive system is virtually identical to that of *H. corruga*, and its shell has similar sculpture.

Humboldtiana sylvania new species

Diagnosis: This species is distinguished by its large size, globose shape, and rotund whorls with a distinct shoulder. The color is straw yellow with three well-defined black bands. The embryonic whorls are smooth. The postembryonic sculpture consists of strong incremental striations and wrinkles. Granular sculpture is absent over the surface of the shell.

Description: The shell (Figures 6–10) is large, up to 36 mm wide. It is slightly depressed-globose, 0.88 times as high as wide, and is thin shelled, and is shiny. The color pattern is straw yellow with three distinct uninterrupted black bands with well-defined straight edges. The upper two bands are about equal in width. The lower band is narrower. The interior of the aperture is tan and

shows the external bands. The umbilical perforation is narrowly rimate due to the reflected columellar margin of the peristome (Figure 9). The shell has 4.0 rotund whorls that are noticeably shouldered with a deeply impressed suture. The body whorl descends to the aperture along the last quarter turn. The 1.5 embryonic whorls are smooth (Figures 8, 10). The first embryonic whorl is 5.1 mm wide transverse to the initial suture. The post-embryonic whorls are sculptured with relatively strong incremental striations and wrinkle which extend undiminished from the suture to the umbilicus. Granular sculpture is absent on all parts of the shell. The rotund aperture is 0.80 times as high as wide and is 0.81 times the height of the shell. The upper lip inserts between the middle and the lower bands. The aperture is prosocline, lying at an angle of 33° to the shell axis. The peristome is blunt, narrowly but distinctly reflected along the upper, outer and basal lips, and is broadly reflected over the umbilical area.

Anatomy (Figures 13, 14): Only the holotype was available for dissection. The head-foot is very dark gray, almost black. The sole is a slightly lighter shade of gray. The mantle is light gray and is mottled with dark gray spots.

The genital atrium (gen at) is very short, almost non-existent (Figure 13). The penis is bulbous with a slight constriction below the apex. The interior of the penis has a moderately slender verge that extends about half the length of the chamber and is surrounded by five heavy glandular folds (Figure 14). The neck of the penis is lined internally with 6–7 low narrow longitudinal folds. The penis retractor muscle (**pr**) is very short and stout. It originates on the inner lung wall immediately behind the middle of the mantle collar, inserts on the apex of the penis and forming a short sheath around the base of epiphallus. The epiphallus (**epi**) is relatively slender for the genus and tapers distally. It is 17 mm long and is almost twice the length of the penis. The interior of epiphallus is lined with four longitudinal folds. The flagellum (**flg**) is moderately long, and is about as long as the combined length of the penis + epiphallus. The interior of the flagellum is lined with four longitudinal folds. The vagina is 30 mm long. The lower vagina (**vag_l**) is short and tapers below to a narrow neck. It bears four dart sacs of equal size (**ds₁**, **ds₂**, etc.), each of which bears a pair of dart bulbs (**db**) along its base. The dart glands (**dgl**) form a well-developed lobed ring around the vagina. They are widely separated from the dart sacs by the middle vagina (**vag_m**), which is slightly longer than the lower vagina. The free vagina (**vag_f**) is very short. The spermathecal duct (**sptd**) is very long and lacks a caecum. The spermatheca (**spt**) is small and ovate in shape. The combined length of the spermatheca + duct is 65 mm. The length of the uterus-prostate (**utr-pro**) is 43 mm.

Holotype: UF 353714, collected by Omar Mejía, 31 August, 2003. Height: 32.0 mm; width: 36.2 mm; aper-

ture height: 26.0 mm; aperture width: 20.9 mm; whorls: 4.0.

Type Locality: Chihuahua, Corareachi, 4.4 km north, 0.4 km west of Baqueachi (27°28.45' N, 107°30.93' W); 2000 m altitude. Corareachi is a very small village, which is unnamed on the INEGI topographic map series 1: 50,000 (G13A32). The type locality is in a *Pinus-Quercus* forest in a grassy glen.

Distribution: Known only from the type locality.

Etymology: The species name *sylvania* derives from the Latin word for woods or forest.

Remarks: Shell and anatomical features in *Humboldtiana sylvania* are similar to those of an unnamed species from near Rancho Blanco, NNE of San Juanito, Chihuahua (Thompson, in press). Important shell and anatomical traits that the two species have in common separate them from other *Humboldtiana*. They share the following shell traits. The embryonic whorls are smooth. The postembryonic whorls are sculptured with coarse incremental striations and wrinkle. Granular sculpture is absent over the entire surface of the shell. The color pattern consists of three black bands on a lighter background.

In addition, they share the following anatomical traits. The outer wall of the lung is light gray and is mottled with numerous small darker-gray spots. The genital atrium is very short and almost non-existent. The bulbous penis has a moderately slender verge that is sur-

rounded in the lower half by heavy longitudinal glandular folds. The epiphallus is relatively slender. The flagellum is about as long as the combined length of the penis + epiphallus. The vagina bears four dart sacs of equal-size that are widely separated from the dart glands. The spermathecal duct lacks a caecum.

Aside from size, the anatomies of the two species are very similar. The shells are distinguished by size and its color. The unnamed species from near Rancho Blanco has a shell that is up to 27 mm wide. Its ground color is light diaphanous brown with three dark brown bands that are interrupted by irregularly spaced alternating dark brown transverse bars and blotches. This contrasts strongly with color of *Humboldtiana sylvania*, in which the straw yellow shell has with three distinct black bands that have discrete edges.

ACKNOWLEDGMENTS

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